

APPENDIX A:

MOTORIZED OVERSNOW VEHICLE ACCESS SCENARIOS

INTRODUCTION

The development of scenarios that distribute use within the parks, based on entrance limits, is necessary in order to model air quality and sound impacts. A scenario was constructed for each alternative considered in detail in the draft SEIS and the final SEIS. The scenarios should be regarded as assumptions, and the same procedure is used for each alternative so that results are comparable between alternatives. Though different assumptions could be made about how use is distributed, the common computational basis allows the alternatives to be related and comparable. Use of a different computational basis would result in the same relative differences between alternatives.

An assumption made in this analysis is that the use limits prescribed by each alternative are reached each day of the peak season (January and February). At least in the short run, this is not likely to be the case. However, over time use will tend to approach the allowable limit. Since a value must be chosen for modeling purposes, the entrance limit is used as a basis for distributing visitation. Any factor that would be applied to attempt to replicate actual use in the short term – as something less than the limit – would necessarily be applied in all alternatives. Hence, the relative difference in comparing alternatives would be the same. Conceptually, the basis for setting use limits at each entrance is to reduce peak use, regarded as a causative factor in many impact assessments, and increase use at other times such that total visitation remains the same. Therefore, assuming the limit as a basis for average daily visitation to the parks appears to be the most straightforward approach.

The initial context for determining use limits is actual data on visitation, collected over the past 10 years. Visitation is shown in the next section for average daily use and for peak day use – from alternative A in the FEIS (current condition). Then, scenarios are presented for the final SEIS alternatives in the following section, along with the alternative entrance use limits for each, and an explanation of how use was distributed.

Table 1: Quick Final SEIS alternative comparison.

Alternative Feature	Avg. Current Condition[†]	FSEIS 1a	FSEIS 1b	FSEIS 2	FSEIS 3	FSEIS 4
Type of Oversnow Motorized Use	Snowcoach, snowmobile. Not Clean and Quiet.	Snowcoach. Mix of old and new, phase in BAT	Snowcoach. Quick phase in of BAT	Snowmobile, snowcoach subj. to EPA rule, early phase-in	Snowmobile, snowcoach Quick phase in of BAT	Snowmobile, snowcoach Quick phase in of BAT
Full implementation of Interim Daily Limits	NA	2003-2004	2004-2005	2005-2006	2003-2004	2003-2004
Daily Entrance Limits 1. YNP North 2. YNP West 3. YNP East 4. YNP South 5. GTNP East (CDST) 6. GTNP West (Grassy)	Snowmobiles 1. 16 2. 538 3. 35 4. 176 5. 25 6. 25	No limits on snowcoaches	No limits on snowcoaches	Snowmobiles 1. 25 2. 600 [‡] 3. 100 4. 225 5. 75 6. No limit+	Snowmobiles 1. 100 2. 330 3. 100 4. 400 5. 100 6. 100	Snowmobiles 1. 50 2. 550 3. 100 4. 250 5. 75 6. 75
Total Daily Allowable Snowmobile Use	815 (avg. current use)	0	0	1025+	1130	1100
Total Jan-Feb Use, snowmobile-days	48,900	0	0	61,500+	67,800	66,000
Total Visitation/Use	Average Use. Historic level	Historic level	Historic level	Increased total use. Snowmobile use 1.3+ X the average use level [‡]	Increased total use. Snowmobile use 1.4 X the average use level	Increased total use. Snowmobile use 1.3 X the average use level
Total Oversnow Vehicle Miles to be allowed and % increase or decrease	37,271 0%	6,309 -83%	6,309 -83%	52,309 +40%	58,513 +57%	54,203 +45%
Emissions Control for Snowmobiles	None	NA	NA	EPA rule	BAT	BAT
Sound: Snowcoach Snowmobile	86dB(A) 86dB(A)	75dB(A)→ 70dB(A)	75dB(A)→ 70dB(A)	78dB(A) 78 or 75dB(A)	75dB(A) BAT	75dB(A) BAT

[†]Ref. FEIS Appendix G, page G-2

[‡]Note: Wyoming proposes phasing-in decreases of daily use limits at West Yellowstone. In revised alternative 2, the first year daily limit would be 825 snowmobiles, the second 725, and the third 600 (or full interim limit implementation). The state wants reductions to be contingent upon the availability of an equivalent number of seats in a “new concept snowcoach.” On the one hand, the state is allowing 5 years to implement a new concept snowcoach, but seats must be available in two years. If a new concept snowcoach is not available in time, the alternative features and effects for Final SEIS alternative 2 would be the same as in Draft SEIS alternative 2.

CURRENT USE: AVERAGE DAILY AND PEAK DAY USE

NPS intent in developing alternatives for the earlier FEIS and for the Supplemental EIS has consistently been to maintain the existing level of visitation through oversnow motorized use in the three park units, which is subject in any case to limitations imposed for resource protection. NPS assumes that visitation can be maintained by implementing new technology, and by encouraging or requiring the use of snowcoach mass-transit access as opposed to individual snowmobile access. For example, the existing decision replaces individual snowmobile access with snowcoach, mass-transit access, holding visitation constant and necessitating a larger snowcoach fleet. The following tables of average daily and average peak day use represent a context in which numbers of visitors may be viewed, with the intent of maintaining those numbers through the range of alternatives. Current or existing use is reflected in FEIS alternative A.

Table 2. Yellowstone, Grand Teton and The Parkway area road segments average daily use January-February.

Road Segment	Segment Miles	Alternative A Current Motorized Use			
		Autos	Buses/Vans	Snowcoaches	Snowmobiles
Mammoth to Northeast Entrance	47	61	4.2	0	0
Mammoth to Norris	21	0	0	3.3	30.5
West Entrance to Madison	14	0	0	9.1	554.2
Madison to Norris	14	0	0	5.2	247.0
Norris to Canyon Village	12	0	0	3.9	184.5
Canyon Village to Fishing Bridge	16	0	0	3.1	148.1
Fishing Bridge to East Entrance	27	0	0	0	36.4
Fishing Bridge to West Thumb	21	0	0	2.6	125.1
Madison to Old Faithful	16	0	0	10.3	488.6
Old Faithful to West Thumb	17	0	0	4.3	209.4
West Thumb to Flagg Ranch	24	0	0	4.3	175.8
Grassy Lake Road	8	0	0	0	24.2
Flagg Ranch to Colter Bay	16	86	9.5	0	24.3
Colter Bay to Moran Junction	10	192	10	0	24.3
Moran Junction to East Entrance	2	562	29	0	24.3
Moran Junction to South Entrance	26	773	39	0	0
Teton Park Road	15	0	0	0	10.4
Moose-Wilson Road	2	5	0	0	3
Totals	308	1679	91.7	46.1	2310.1

Existing Condition Scenario Details:

- Average daily entrance figures (Ref. FEIS Appendix G, page G-2) for YNP: North, 16; West, 538; South, 176; East, 35. Using these average entrance figures, the average total use in YNP on a daily basis is 765 snowmobiles.
- Average daily use in GTNP and the Parkway is estimated at 25 snowmobiles on the CDST (east GTNP) and 25 on Grassy Lake Road (west GTNP).

- Total average daily use in the three park units is 815.
- Over the peak use season, January and February, total average snowmobile use in YNP is about 45,900 snowmobiles.
- Total season use in all units is 48,900.

Table 3. Average peak day use (based on highest use day for each year).

Road Segment	Current Condition			
	Autos	Buses/Vans	Snowcoaches	Snowmobiles
Mammoth to Northeast Entrance	107.4	8	0	0
Mammoth to Norris	0	0	6.9	40.5
West Entrance to Madison	0	0	19.0	975.4
Madison to Norris	0	0	10.9	434.7
Norris to Canyon Village	0	0	8.2	324.7
Canyon Village to Fishing Bridge	0	0	6.5	260.7
Fishing Bridge to East Entrance	0	0	0	64.1
Fishing Bridge to West Thumb	0	0	5.4	220.2
Madison to Old Faithful	0	0	21.5	859.9
Old Faithful to West Thumb	0	0	9.0	368.5
West Thumb to Flagg Ranch	0	0	9.0	376.8
Grassy Lake Road	0	0	0	42.6
Flagg Ranch to Colter Bay	151.4	16.7	0	42.8
Colter Bay to Moran Junction	337.9	17.6	0	42.8
Moran Junction to East Entrance	989.1	51.0	0	42.8
Moran Junction to South Entrance	1291.8	68.6	0	0
Teton Park Road	0	0	0	18.3
Moose-Wilson Road	8.8	0	0	5.3

Note: Figures were derived from the following sources: entrance station statistics: visitor use statistics from Visitor Services Offices of Yellowstone and Grand Teton National Park and the John D. Rockefeller, Jr., Memorial Parkway 1992-1999. Interior road segments in Yellowstone NP and Grand Teton NP: *Social Conditions for Winter Use in Yellowstone National Park Final Report* (Borrie et. al 1997) and *Winter Use Survey Yellowstone and Grand Teton National Park and the John D. Rockefeller, Jr., Memorial Parkway* (Littlejohn 1996). Tables are reproduced from the FEIS, App. G.

MOTORIZED USE SCENARIOS FOR EACH FINAL SEIS ALTERNATIVE

Summary of Changes Between Final SEIS Alternatives and Draft SEIS Alternatives

Alternative scenarios evaluated in the Final SEIS are as follows: alternative 1a, unchanged from the Draft SEIS; alternative 1b, unchanged from the Draft SEIS; alternative 2, entrance limits changed from the Draft SEIS; alternative 3, unchanged from the Draft SEIS; and alternative 4, a new alternative for the

Final SEIS. In addition, the implementation years for each alternative have been delayed a year due to the extension of the timeframe for the preparation of the SEIS.

Alternatives 1a and 1b Scenarios

Usage in the 1a scenario replicates the level of current visitor use - accommodating the average daily use with access over snow roads via snowcoach only. This scenario is the same as in Alternative G from the FEIS. The emissions and sound factors associated with snowcoaches to model impacts is based on a mix of old and newer snowcoaches. Average daily use in this scenario is 391 snowcoach days, for a total peak season use of 23,460 snowcoach days.

Usage in the 1b scenario is the same as in Alternative 1a from the FEIS, except that it would be implemented one year later. This alternative is also distinguished from 1a by modeling the emissions and sound factors associated with BAT snowcoaches instead a mix of old and newer snowcoaches.

Table 4. Alternatives 1a and 1b scenarios - average daily use by road segment in 2004-2005 and beyond for 1a, and 2005-2006 and beyond for 1b.[†]

Road Segment/Area	Average Daily Vehicle Use January-February				
	Autos	Vans	Snowcoaches	Snowmobiles	Buses
Mammoth to Northeast Entrance	60	4	0	0	0
Mammoth to Norris	0	0	8	0	0
West Entrance to Madison	0	0	88	0	0
Madison to Norris	0	0	40	0	0
Norris to Canyon Village	0	0	30	0	0
Canyon Village to Fishing Bridge	0	0	24	0	0
Fishing Bridge to East Entrance	0	0	5	0	0
Fishing Bridge to West Thumb	0	0	20	0	0
Madison to Old Faithful	0	0	80	0	0
Old Faithful to West Thumb	0	0	34	0	0
West Thumb to Flagg Ranch	0	0	29	0	0
Grassy Lake Road	0	0	4	0	0
Flagg Ranch to Colter Bay	0	0	29	0	0
Colter Bay to Moran Junction	190	10	0	0	1
Moran Junction to East Entrance	560	28	0	0	2
Moran Junction to South Entrance	770	37	0	0	2
Jackson Lake Area	0	0	0	0	0
Teton Park Road	0	0	0	0	0
Moose-Wilson Road	5	0	0	0	0

[†]For the primary winter season from January 1 through February 29, 2000, with snowcoaches accommodating all visitor days currently (in accordance with the FEIS and ROD) used by snowmobilers. For 1a, snowmobile use was to be capped at 50% of the average in 2002-2003. For 1b, snowmobile use would be capped at 50% of the average one year later in 2003-2004.

Final SEIS Alternatives 2, 3, and 4 Scenarios

Usage in these scenarios is based on the following type of computation. For each park entrance there is a figure for maximum daily allowable snowmobile use - as expressed in the alternative description. From the use distribution tables in Volume 2 (Appendix A) of YNP's transportation planning model, the percentages of snowmobile use originating at each entrance for each snow road segment may be found. For each entrance or gateway segment, the maximum allowable use (e.g. 500 at YNP West) is a percentage (.938) of the total use on the segment. With this relationship, total use on the segment may be determined by division (where x = the total use on the segment, $0.938 x = 500$. Solving for x , $x = 500 \times 1/0.938 = 533$). This calculation was performed for each gateway segment. Use on the internal segments was determined from the same set of tables in the transportation plan. For these segments, the percentage of all vehicles in the park using that segment is applied to the total maximum allowable number of snowmobiles in the park. All factors applied are shown in Table 8. Snowcoach figures were adjusted where necessary to accommodate the average daily use figures by road segment shown in Table 2. Note: it is evident that in final SEIS alternatives 2, 3 and 4, visitation by oversnow motorized access would not only be maintained, but it would be greatly increased should the daily maximum be reached on most days.

Final SEIS Alternative 2 Details

- Alternative 2 Entrance Limits (revised from draft SEIS):
 YNP North = 25; YNP West = 825(02-03), 725(03-04), 600(04-05); YNP East = 100;
 YNP South = 225; CDST (GTNP East) = 75; Grassy Lake Road (GTNP west) = unlimited
- Total daily allowable use in the final phase-in year into YNP = 950 snowmobiles.
- Total allowable peak season use in YNP = 57,000.
- Total daily allowable use in the 3 park units = 1025 plus unlimited use on Grassy Lake Rd.
- Total allowable peak season use in the 3 park units = 61,500 plus unlimited use on Grassy Lake Rd.

Table 5. Final SEIS alternative 2 scenario - daily use by road segment in 2004-2005.[†]

Road Segment/Area	Daily Vehicle Use January-February				
	Autos	Vans	Snowcoaches	Snowmobiles	Buses
Mammoth to Northeast Entrance	60	4	0	0	0
Mammoth to Norris	0	0	3	50	0
West Entrance to Madison	0	0	10	640	0
Madison to Norris	0	0	5.0	289	0
Norris to Canyon Village	0	0	3.5	214	0
Canyon Village to Fishing Bridge	0	0	3.0	173	0
Fishing Bridge to East Entrance	0	0	0	210	0
Fishing Bridge to West Thumb	0	0	2.0	146	0
Madison to Old Faithful	0	0	10.0	571	0
Old Faithful to West Thumb	0	0	4.0	240	0
West Thumb to Flagg Ranch	0	0	2.0	316	0
Grassy Lake Road	0	0	0	75	0
Flagg Ranch to Colter Bay	0	0	0	75	0
Colter Bay to Moran Junction	190	10	0	75	1
Moran Junction to East Entrance	560	28	0	75	2
Moran Junction to South Entrance	770	37	0	0	2
Jackson Lake Area	0	0	0	40	0
Teton Park Road	0	0	0	0	0
Moose-Wilson Road	5	0	0	0	0

[†]Full phase-in of new technology and interim cap on use occurs in the winter of 2005-06 in this alternative. Use at West Entrance is to be 825 in 2003-2004 and 725 in 2004-2005.

Final SEIS Alternative 3 Scenario details:

- Alternative 3 Daily Entrance Limits:
 YNP North = 100; YNP West = 330; YNP East = 100; YNP South = 400; CDST (GTNP east) = 100;
 Grassy Lake Road (GTNP west) = 100.
- Total daily allowable use into YNP = 930 snowmobiles.
- Total allowable peak season use in YNP = 55,800 snowmobiles.
- Total daily allowable use in the 3 park units = 1130.
- Total allowable peak season use in the 3 park units = 67,800.

Table 6. Final SEIS alternative 3 scenario - daily use by road segment in 2004-2005.[†]

Road Segment	Daily Vehicle Use January-February				
	Autos	Vans	Snowcoaches	Snowmobiles	Buses
Mammoth to Northeast Entrance	60	4	0	0	0
Mammoth to Norris	0	0	3	198	0
West Entrance to Madison	0	0	33	352	0
Madison to Norris	0	0	12	290	0
Norris to Canyon Village	0	0	4	215	0
Canyon Village to Fishing Bridge	0	0	3	174	0
Fishing Bridge to East Entrance	0	0	0	210	0
Fishing Bridge to West Thumb	0	0	3	147	0
Madison to Old Faithful	0	0	33	574	0
Old Faithful to West Thumb	0	0	5	241	0
West Thumb to Flagg Ranch	0	0	5	563	0
Grassy Lake Road	0	0	0	100	0
Flagg Ranch to Colter Bay	0	0	0	100	0
Colter Bay to Moran Junction	190	10	0	100	1
Moran Junction to East Entrance	560	28	0	100	2
Moran Junction to South Entrance	770	37	0	0	2
Jackson Lake Area	0	0	0	0	0
Teton Park Road	0	0	0	0	0
Moose-Wilson Road	5	0	0	0	0

[†]Alternative 3 caps would be implemented in 2004-2005, one year before the full implementation of alternative 2.

Final SEIS Alternative 4 Details:

- Alternative 4 Daily Entrance Limits:
 YNP North = 50; YNP West = 550; YNP East = 100; YNP South = 250; CDST (GTNP East) = 75;
 Grassy Lake Road (GTNP West) = 75
- Total daily allowable use into YNP = 950 snowmobiles.
- Total allowable peak season use in YNP = 57,000.
- Total daily allowable use in the 3 park units = 1100.
- Total allowable peak season use in the 3 park units = 66,000.

Table 7. Final SEIS alternative 4 scenario - daily use by road segment in 2004-2005.[†]

road segment	Daily Vehicle Use January-February				
	Autos	Vans	Snowcoaches	Snowmobiles	Buses
Mammoth to Northeast Entrance	60	4	0	0	0
Mammoth to Norris	0	0	3	99	0
West Entrance to Madison	0	0	10	589	0
Madison to Norris	0	0	5	296	0
Norris to Canyon Village	0	0	3.5	219	0
Canyon Village to Fishing Bridge	0	0	3	178	0
Fishing Bridge to East Entrance	0	0	0	211	0
Fishing Bridge to West Thumb	0	0	2	150	0
Madison to Old Faithful	0	0	10	586	0
Old Faithful to West Thumb	0	0	4	246	0
West Thumb to Flagg Ranch	0	0	2	353	0
Grassy Lake Road	0	0	0	75	0
Flagg Ranch to Colter Bay	0	0	0	75	0
Colter Bay to Moran Junction	190	10	0	75	1
Moran Junction to East Entrance	560	28	0	75	2
Moran Junction to South Entrance	770	37	0	0	2
Jackson Lake Area	0	0	0	0	0
Teton Park Road	0	0	0	0	0
Moose-Wilson Road	5	0	0	0	0
Antelope Flats Route	0	0	0	0	0

[†] Alternative 4 interim caps would be implemented in 2004-2005 and remain unchanged in 2005-2006.

Supplemental Tables

Table 8. Factors used to distribute use within the parks based on entrance limits in each alternative.

ROAD SEGMENT/AREA	% of total daily use on segment, [†] applied to total allowable use for each alternative.	% factor applied to allowable use at each entrance to estimate use on entrance segment. [‡]
Mammoth to Norris	NA	$1/0.505 = 1.98$
West Entrance to Madison	NA	$1/0.938 = 1.07$
Madison to Norris	0.312	NA
Norris to Canyon Village	0.231	NA
Canyon Village to Fishing Bridge	0.187	NA
Fishing Bridge to East Entrance	NA	$1/0.475 = 2.11$
Fishing Bridge to West Thumb	0.158	NA
Madison to Old Faithful	0.617	NA
Old Faithful to West Thumb	0.259	NA
West Thumb to Flagg Ranch	NA	$1/0.711 = 1.41$
Grassy Lake Road	NA	1.00
Flagg Ranch to Colter Bay	NA	1.00
Colter Bay to Moran Junction	NA	1.00
Moran Junction to East Entrance	NA	1.00
Jackson Lake Area	NA	NA

[†]Ref. Yellowstone National Park Transportation Plan, Volume 2, Appendix A, Use distribution tables.

[‡]The factors 0.505, 0.938, 0.475, and 0.711 are derived from the referenced transportation plan, conveying the idea that the number of snowmobiles coming in at each entrance is less than the number of snowmobiles traveling on the respective gateway segment during the day. The factors, expressed as use on the gateway segment, are adjusted from percentage use on each segment, re-entry rate estimates, and judgment as reviewed and agreed by Kim Raap, Wyoming State Trails Coordinator. In the use calculation shown in the narratives for each scenario, use on each gateway segment is the objective function. In solving the equation for use, it is necessary and expedient to show, in this table, the factor from the transportation plan (entrance number as a percentage of use on the segment) as an inverse (the ratio of amount of use on the segment to the number allowed in at the entrance). In this manner, the allowable use number can be multiplied directly by the ratio to obtain the amount of use on the gateway segment in each scenario.

Table 9: Total oversnow vehicle miles traveled daily in each Final SEIS scenario.

Road Segments	Segment Miles	Current Condition	SEIS 1a and 1b	SEIS 2	SEIS 3	SEIS 4
Mammoth to Norris	21	710	168	1113	4221	2142
West Entrance to Madison	14	7886	1232	9100	5068	8386
Madison to Norris	14	3531	560	4116	4133	4214
Norris to Canyon Village	12	2261	360	2610	2135	2670
Canyon Village to Fishing Bridge	16	2420	384	2816	3410	2896
Fishing Bridge to East Entrance	27	983	135	5670	5670	5697
Fishing Bridge to West Thumb	21	2682	420	3108	3142	3192
Madison to Old Faithful	16	7983	1280	9296	9313	9536
Old Faithful to West Thumb	17	3633	578	4148	4170	4250
West Thumb to Flagg Ranch	24	4322	696	7632	13615	8520
Grassy Lake Road	8	184	32	600	800	600
Flagg Ranch to Colter Bay	16	379	464	1200	1600	1200
Colter Bay to Moran Junction	10	248	0	750	1000	750
Moran Junction to East Entrance	2	49	0	150	200	150
Totals	218	37271	6309	52309	58513	54203
% Increase/decrease in total oversnow vehicle miles traveled in each scenario relative to current condition		0%	-83%	+40%	+57%	+45%

APPENDIX A: MOTORIZED OVERSNOW VEHICLE ACCESS SCENARIOS

Table 10: Oversnow vehicle miles traveled, by alternative, by road segment.

Road Segments	Segment Miles	Current Condition		FSEIS 1a and 1b	FSEIS 2		FSEIS 3		FSEIS 4	
		Coach	Snowmobile	Coach	Coach	Snowmobile	Coach	Snowmobile	Coach	Snowmobile
Mammoth to Norris	21	69	641	168	63	1050	63	4158	63	2079
West Entrance to Madison	14	127	7759	1232	140	8960	140	4928	140	8246
Madison to Norris	14	73	3458	560	70	4046	73	4060	70	4144
Norris to Canyon Village	12	47	2214	360	42	2568	47	2088	42	2628
Canyon Village to Fishing Bridge	16	50	2370	384	48	2768	50	3360	48	2848
Fishing Bridge to East Entrance	27	0	983	135	0	5670	0	5670	0	5697
Fishing Bridge to West Thumb	21	55	2627	420	42	3066	55	3087	42	3150
Madison to Old Faithful	16	165	7818	1280	160	9136	165	9184	160	9376
Old Faithful to West Thumb	17	73	3560	578	68	4080	73	4097	68	4182
West Thumb to Flagg Ranch	24	103	4219	696	48	7584	103	13512	48	8472
Grassy Lake Road	8	0	184	32	0	600	0	800	0	600
Flagg Ranch to Colter Bay	16	0	379	464	0	1200	0	1600	0	1200
Colter Bay to Moran Junction	10	0	248	0	0	750	0	1000	0	750
Moran Junction to East Entrance	2	0	49	0	0	150	0	200	0	150
Totals	218	762	36509	6309	681	51628	769	57744	681	53522